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DIRECTIONAL RELAY - RESISTANCE RELAY MATHEMATICIAN DUALISM

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Keywords: Directional relay, distance protection, adaptive relaying, fault current modulation, comparator, Phase comparison, Mho relay.
Abstract: The proposed method calculates the phase angle of faulted loop current by determining the pure-fault impedance of the renewable plant at every instant following fault detection, irrespective of the control scheme associated with the plant. Utilizing the information, it calculates the line impedance up to fault point accurately. Comparative assessment with the conventional distance relaying technique reveals its superiority.

Directional relay :
Phase comparison : Directional relay , basically , between U and I phase relationships comparative phase is a comparator and the relay operates in the position of -90 ° ≤ θ 90 °. In the case of a static directional relay, the inputs Uva IZR and the characteristic are as follows

$$Z\, Z_R \cos(\varphi - \theta) \geq 0$$

Here , Z is the fault resistance to the ratio of U and I equal , ZR - in the relay extract resistance , φ- phase angle between U and I and θ- relay characteristic angle.
Z and ZR are zero equal to to be possible it's not .
cos ($\varphi - \theta) \geq 0$ or $\varphi - \theta = \pm \pi/2$
Amplitude comparison :
Amplitude comparison for the following inputs will be -
V + I ZR and V - I ZR
Relay performance for -
|V + I ZR| > |V – I ZR|
or |Z + ZR| > |Z – ZR|
and never how operation failure to perform for the following condition to be need :
|Z + ZR| < |Z – ZR|
ii. Resistance relay :
Amplitude comparison : Contrast relay by nature amplitude is a comparator and inputs are I ZR and U .
Relay performance for -
|I ZR| >|U|
or |Z| < | ZR|
or R + jX < ZR
Resistance (RX) diagram according to circle equation is the case R + jX = ZR for .
1.12 (a)- in the picture as shown , the radius is ZR equal to has been circle and start at the point center , resistance relay characteristic is considered
Phase comparison : Inputs (V + I ZR) and (V - I ZR). Characteristic 1.12 (b)- in the picture given . Apparently since the radius of ZR is ZR circle circle across lying down there are two magnitude (Z + ZR) and (Z - ZR) ± 90 ° angle harvest does _ This is in Figure 1.12(a). as shown , one different characteristic will give .

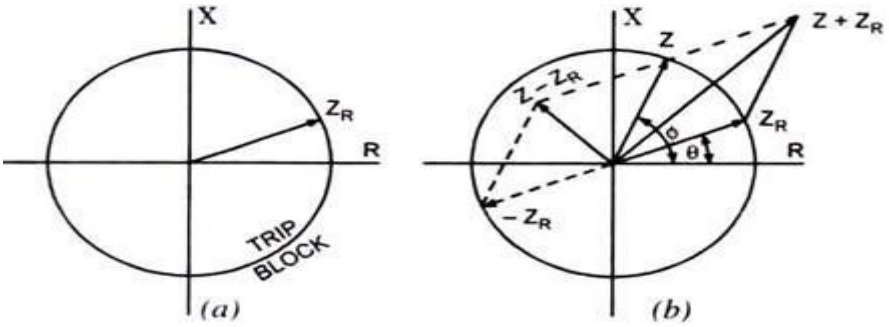

Figure 1.12. Resistance relay characteristic .

iii. Angle resistance relay :

Amplitude comparison :

Two access quantity (2IZR - U) and U and relay performance for -

|2IZR – U| >|U|

or |2ZR – Z| >|Z|

The characteristic is shown in Fig. 1.13 (a).

Phase comparison :

Two access quantity (IZR -U) and IZR and place performance for (ZR - Z) and between ZR phase angle within ± 90 ° to be need _ Apparently because the normal to ZR of the characteristic is right line _ If the Z line under is located if , between (ZR - Z) and Z angle within ± 90 ° limits lies (Fig. 1.13 -(b)).

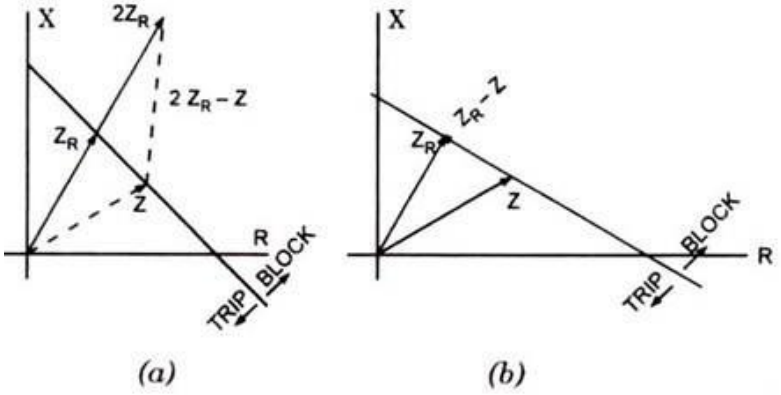

Figure 1.13. Angle resistant relay characteristic .

iv. Reactive relay :

Amplitude comparison : This is a relay corner of resistance to himself special status being , then of resistance reactive component is measured and therefore because of relay performance for

|2Xr – Z| > |Z|

Two input is U and (2IZR-2IRr-U) , that is RR to ZR resistance on the ground is equalized , therefore because of only his reactive component XR remains .

Phase comparison : Two input IZR and (IZR -U) angle resistance relay such as . When it is below the Z characteristic , i.e. (Ψ+ θ) < 180°, it turns off the relay. For Z to be purely reactive, r is 90° under boundary conditions, and in the RX diagram Zsin φ, $X_R$if , is less than , the relay will trip.

c. Mho or corner access relay :

This is the corner resistance relay is the opposite . Two relay of each other is dual . resistance in the diagram one kind of equation permission in the diagram another kind of to Eq suitable will come and vice versa . Mho or access relay for characteristic on the GB diagram from the beginning right line shift , in the RX diagram while from the coordinate passing circle will be

Amplitude comparison : Two input - |IZR| and |2U – IZR|.

Relay performance for -

|2U – IZR| <|IZR|

or |2Z – ZR| < |ZR|

The characteristic is shown in Figure 1.14 . Relay Z fault resistance to ZR diameter have has been circle inside when located works _

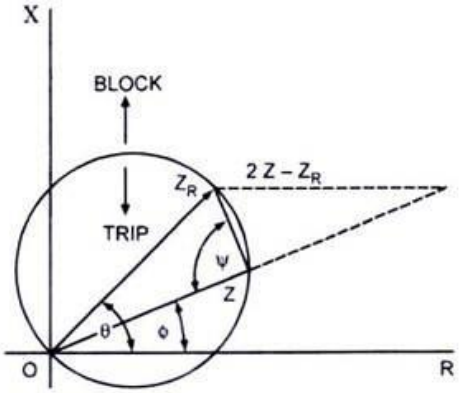

Figure 1.14. Mho relay characteristic .

Steps comparison : Two input - |IZR – U| and He and relay they are between phase angle from 90° less , that is , it works when 90° > Ψ> – 90°.

Mho relay by nature directional relay that it was due to , phases comparison more convenient is a construction .

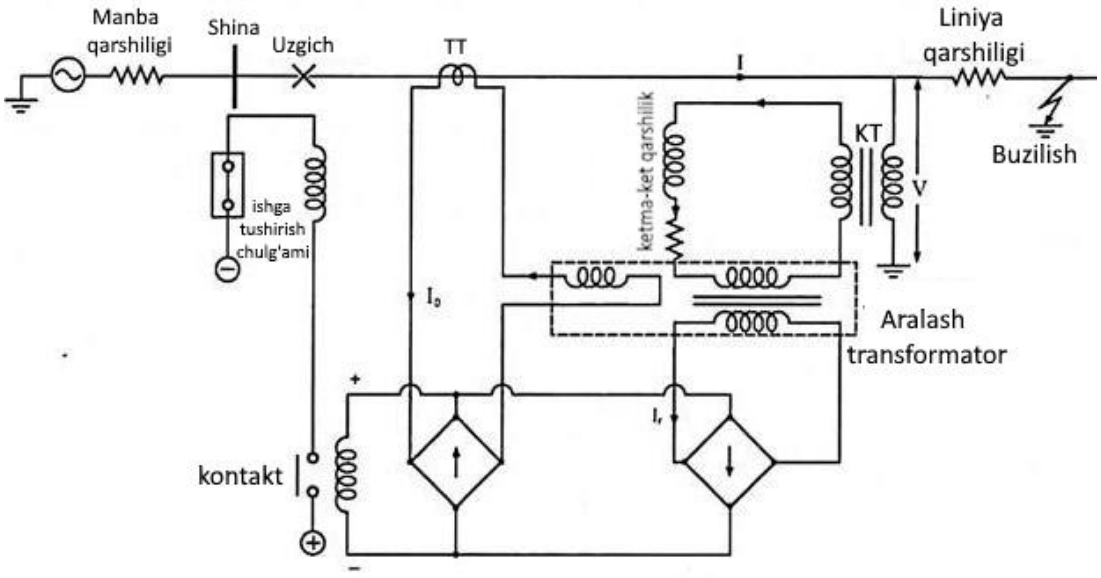

Figure 1.15. Mho relay comparator .

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